GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION
PROVINCIAL CONTROLLED TEST

MARCH 2023
GRADE 11 MARKING GUIDELINES

PHYSICAL SCIENCES
GRADE11

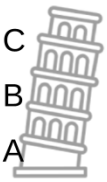
MARKS: 100

This Marking Guideline consists of 7 pages. Including analysis grid

Stanmorephysics

QUESTION 1 / *VRAAG 1:*

1.1	A	(2)
1.2	C	(2)
1.3	B	(2)
1.4	A	(2)
1.5	D	(2)
1.6	A	(2)
1.7	D	(2)
1.8	B	(2)
1.9	D	(2)
1.10	B	(2)
		[20]



QUESTION 2:

2.1 0 N ✓ (1)

2.2 A body will remain in its state of rest or motion at constant velocity unless a non-zero resultant/net force acts on it. ✓✓ (2)

2.3.1 $T_{x1} = T_1 \times \cos 30^\circ$ ✓

$= 381{,}05 \times \cos 30^\circ$

$= 330$ N West/ left ✓

$T_{y1} = T_1 \times \sin 30^\circ$ (3)

$= 381{,}05 \times \sin 30^\circ$

$= 190{,}53$ N North/ up ✓

2.3.2 $T_{x2} = T_2 \times \cos 60^\circ$

$= 660 \times \cos 60^\circ$

$= 330$ N East/ right ✓

$T_{y2} = T_2 \times \sin 60^\circ$

$= 660 \times \sin 60^\circ$ (2)

$= 571{,}58$ N North/ up ✓



2.3.3 $T_{xnet} = 0$ N and $T_{ynet} = 0$ N Equilibruim ✓

$\therefore \quad T_{y2} + T_{y1} = F_g = m \times g$

$571{,}58 + 190{,}53 = m \times 9{,}8$ ✓

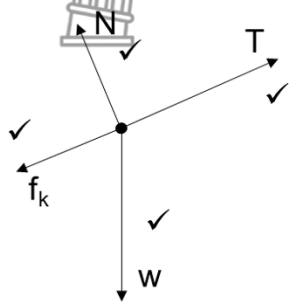
m = 77,77 kg ✓ (3)

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QUESTION 3:

3.1. The force that opposes the motion of a moving object relative to a surface. (2)

3.2.



N = normal force

T = tension force

w = weight

f_k = friction / kinetic friction

(4)

3.3. $f_k = \mu_k N$ ✓

$= \mu_k F_g \cos\theta$

$=(0,3)[(2)(9,8)\cos 30^o]$ ✓

= 5,09 N ✓ (3)

3.4. When resultant force acts on an object, the object will accelerate in the direction of the force at an acceleration directly proportional to the force and inversely proportional to the mass of the object. ✓✓ (2)

3.5.

2kg	5 kg
$F_{net} = ma$ ✓	$F_{net} = ma$
$T - F_{g\parallel} - f_k = ma$	$F_g - T = ma$
$T - F_g \sin\theta - f_k = ma$	$(5)(9,8) - T = 5a$
$T - (2)(9,8)\sin 30^o - 5,09 = 2a$	$49 - T = 5a$ ✓.....(2)
$T - 14,89 = 2a$ ✓.....(1)	

Add 1 and 2: $T - 14,89 = 2a$ ✓

$\underline{49 - T = 5a}$

$34,11 = 7a$

$a = 4,87\ m.s^{-2}$ ✓ (5)

3.6. $T - 14,89 = 2a$ ✓ (into 1 or 2)

$T - 14,89 = 2(4,87)$

$T = 34,37$ N ✓ (2)

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QUESTION 4:

4.1 Every particle in the universe exerts a force of gravitational attraction on every other particle. The force between the two particles is directly proportional to the product of their masses ✓and inversely proportional to the square of the distance between **their centres**. ✓ (2)

4.2 $F = \frac{Gm_1m_2}{r^2}$ ✓

$36,99$ ✓ $= \frac{6 \times 10^{-11} \times 5,98 \times 10^{24} \times 4197250}{(r)^2}$ ✓ (5)

$= 6380672738 \text{ m} \div 1000$

$= 6380672,74 \text{ km}$

Height above surface of earth = $6388449307 - 6,38 \times 10^6$ ✓

$= 672,74 \text{ km}$ ✓

4.3 $F = \frac{Gm_1m_2}{r^2}$

$F = \frac{6 \times 10^{-11} \times 4197250 \times 2900}{(200)^2}$ ✓ (3)

$= 1,83 \times 10^{-5}$ N attraction ✓

4.4 REMAIN THE SAME (1)

4.5 The force of attraction between the Soyus capsule and the Space station is so small that it will no affect the acceleration. ✓✓ (2)

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QUESTION 5:

5.1 The magnitude of the electrostatic force exerted by two-point charges (Q_1 and Q_2) on each other is directly proportional to the product of the magnitudes of the charges and inversely proportional to the square of the distance (r) between them. ✓✓ (2)

5.2.1 $\mathbf{F = \frac{kQ_1Q_2}{r^2}}$ ✓

$= \frac{(9 \times 10^9)(8 \times 10^{-8})(2 \times 10^{-8})}{(44 \div 1000)^2}$ ✓

= 74,38 N upwards/ North. ✓ (3)

5.2.2 $F_{net}{}^2 = F_{Q1}{}^2 + F_{Q2}{}^2$ ✓

$= \sqrt{74{,}38^2 + 74{,}38^2}$ ✓

$= 105{,}19$ N✓ (3)

5.2.3 45 ° ✓ (1)

5.3.1 REMAIN THE SAME ✓ (1)

5.3.2 Opposite to initial direction/ 225° ✓ Repulsion✓ (2)

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[9]

Question 6

6.1The force ✓per unit charge ✓ at that point. (2)

6.2 $E = \frac{kQ}{r^2}$ ✔

$E = \frac{(9 \times 10^9)(6{,}5 \times 10^{-12})}{(0.003)^2}$ ✔

$E = 6{,}5 \times 10^3\ N \cdot C^{-1}$ ✔ (3)

6.3 **At point X**

$E_Q = 6{,}5 \times 10^3\ N \cdot C^{-1}\ West$ ✔

$E_R = \frac{kQ}{r^2}$

$E_R = \frac{(9 \times 10^9)(6{,}5 \times 10^{-12})}{(0.003)^2}$

$E_R = 6{,}5 \times 10^3\ N \cdot C^{-1}\ East$ ✔

$E_{net} = E_Q + E_R$ ✓

$E_{net} = 6{,}5 \times 10^3 + (-6{,}5 \times 10^3)$

$E_{net} = 0\ N \cdot C^{-1}$ ✔ (4)

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Question 7

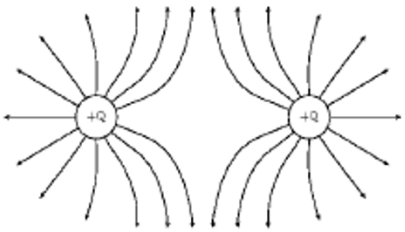
7.1To ensure that charge does not leak to the ground/insulated. ✓ (1)

7.2 Net charge $= \frac{Q_R + Q_S}{2}$

$Q_{net} = \frac{+8 + (-4)}{2}$ ✓

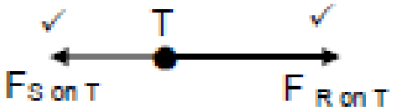
$Q_{net} = 2\mu C$ ✓ (2)

7.3.1



(3)

Criteria	Marks
Correct direction of field lines	✓
Shape of the electric field	✓
No field line crossing each other	✓



(2)

7.3.2 **OPTION 1**

$F = \frac{kQ_1Q_2}{r^2}$ ✓

$F_{ST} = \frac{(9\times10^9)(1\times10^{-6})(2\times10^{-6})}{(0,2)^2}$ ✓ ✓

$F_{ST} = 0,45\ N$ left

$F_{RT} = \frac{(9\times10^9)(2\times10^{-6})(1\times10^{-6})}{(0,1)^2}$ ✓

$F_{RT} = 1,8\ N$ right

$F_{net} = F_{ST} + F_{RT}$
$F_{net} = 1{,}8 + (-0{,}45)$ ✔
$F_{net} = 1{,}35\ N$ right or towards sphere S ✔ (6)

7.3.3 **OPTION 1**

$E = \frac{F}{q}$ ✔
$E = \frac{1{,}35}{1\times10^{-6}}$ ✔
$E = 1{,}35 \times 10^{6} N \cdot C^{-1}$ ✔

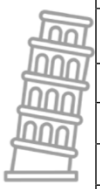
OPTION 2

$E = \frac{F}{q}$ ✔
$E = \frac{1{,}8}{1\times10^{-6}}$ ✔
$E = 1{,}8 \times 10^{6} N \cdot C^{-1}$

$E = \frac{0{,}45}{1\times10^{-6}}$
$E = 4{,}5 \times 10^{5} N \cdot C^{-1}$

$E_{net} = 1{,}8 \times 10^{6} - 4{,}5 \times 10^{5}$
$E_{net} = 1{,}35 \times 10^{6} N \cdot C^{-1}$ ✔ (3)
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Taxonomy Grid



Recall		Comprehension		Analysis		Evaluation	
Q no:	**Mark**	**Q no:**	**Mark**	**Q no:**	**Mark**	**Q no:**	**Mark**
1.1	2	1.2	2	1.3	2	1.5	2
1.7	2	1.4	2	1.6	2		
		1.8	2	1.9	2		
		1.10	2				
2.1	2	2.2	3	2.4	5		
		2.3	2				
3.1	2	3.2	4	3.3	3		
		3.4	2	3.5	6		
		3.6	2				
4.1	2	4.3	3	4.2	4	4.4.1	1
						4.4.2	2
5.5	2	5.1	2	5.2	3	5.4	2
		5.3	4				
6.1	2	6.2	2	6.3	5		
7.1	2	7.3	2	7.4	4	7.5	3

Total mark	**16%**	**16**	**34%**	**34**	**40%**	**40**	**10%**	**10**
Total %/**100%**	**P1&2: 15%**		**P1:35%/P2:40%**		**P1:40%/P2:35%**		**P1&2: 10%**	

